

NOFORN
Maintenance Effectiveness Review (MER) Analyzed 6/15/1999

DATE: June 2000	MIP SERIES: 4402 SO-401	PERIODICITY: Q-14
-----------------	----------------------------	-------------------

LOCATION:

SHIP SYSTEM: Exterior Communications 440
 SYSTEM: Radio Systems 44#
 SUB SYSTEM: Communication Transceivers 44##
 EQUIPMENT: AN/GRC-211 Radio Set 44###Z

RATES	MAN-HOURS	RATES	MAN-HOURS
ET3	0.9		
TOTAL MAN-HOURS: 0.9		ELAPSED TIME: 0.9	

MAINTENANCE REQUIREMENT DESCRIPTION

1. Measure AN/GRC-211 Transmitter Power Output.
2. Measure Transmitter Frequency.
3. Measure Receiver RF Sensitivity and ACG Response.
4. Measure Receiver Bandwidth and Verify Squelch Release and Operation.

SAFETY PRECAUTIONS

1. Forces afloat comply with NAVOSH Program Manual for Forces Afloat, OPNAVINST 5100.19 series; shore activities comply with NAVOSH Program Manual, OPNAVINST 5100.23 series.
2. Ensure all tag-out procedures are in accordance with current shipboard instructions.

TOOLS, PARTS, MATERIALS, TEST EQUIPMENT

TEST EQUIPMENT

1. [00396] Dummy load 600w, 0.0ghz-3.0ghz, SCAT 4683
2. [01053] Power meter, thruline, 1kw, SCAT 4958
3. [01692] Analyzer, dist, 5hz-600khz, SCAT 4344

MATERIALS

1. [00565] Grease, general purpose, MIL-G-23549
 Hazardous Material User's Guide (HMUG) Group 8, Disposal Method 1

MISCELLANEOUS

1. [01365] Technical manuals/drawings (NAVELEX 0967-LP-544-5020; T.O. 31R2-2GRC211-2; T.O. 31R2-2GRC211-4)
2. [02080] Resistor, fixed, film, 620 Ohm, 1 W
3. [02687] Adapters/connectors, testing, No NSN -- W/C provide (Cable, test, phone plug an one end and dual banana plug on the other) (6')

NOTE: Numbers in brackets can be referenced to Standard PMS Materials Identification Guide (SPMIG) for stock number identification.

DISTRIBUTION STATEMENT F:

NOFORN: SPECIAL HANDLING REQUIRED. NOT RELEASABLE TO FOREIGN NATIONALS. Further dissemination only as directed by Naval Sea Systems Command (SEA 04M), June 2000, or higher DOD authority. Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

NOFORN

HAZARDOUS MATERIALS CONTROL STATEMENT (U)

The Hazardous Material Users Guide (HMUG), OPNAV P-45-110-(), provides additional control measures, precautions, personal protective equipment (PPE), and spill controls for the hazardous material(s) identified in the Tools, Parts, Materials, Test, Equipment block. Maintenance personnel shall determine if additional PPE is necessary to accomplish the MRC and take appropriate action to obtain and wear such PPE to ensure the safety of maintenance personnel. Report any deficiencies via PMS feedback report.

PROCEDURE

CAUTION: Radios utilizing an authorized distress frequency must be tuned to an authorized test frequency prior to performing any maintenance.

Preliminary

WARNING: Ensure all tag-out procedures are in accordance with current shipboard instructions.

- a. Set switches and controls: REMOTE-LOCAL to LOCAL, ON-OFF to ON, and MEGAHERTZ to 134.000.
- b. Turn on test equipment; allow 15-minute warmup.

1. Measure AN/GRC-211 Transmitter Power Output.

- a. Disconnect ANT-XCVR coaxial jumper.
- b. Connect wattmeter with dummy load to XCVR.
- c. Key transmitter; verify that:
 - (1) Wattmeter indicates 25 to 32 watts.
 - (2) Forward power position of front panel meter indicates same reading as wattmeter $\pm 10\%$
- d. Unkey transmitter.

2. Measure Transmitter Frequency.

- a. Set COAX-T attenuator for 60 dB; connect between wattmeter and dummy load with T end connected to frequency counter.
- b. Key transmitter and adjust attenuator for stabilized counter indication; verify that frequency counter indicates within tolerances listed in table 1 at assigned frequency.

Frequency	Tolerance (MHz)
116.0	115.9995 to 116.0005
151.9	151.8894 to 151.9006

Table 1

- c. Unkey transmitter.
- d. Set MEGAHERTZ switches successively to 116.000 and 151.900; at each frequency, repeat steps 2.b. and 2.c.
- e. Disconnect test equipment.

3. Measure Receiver RF Sensitivity and ACG Response.

CAUTION: Keying transmitter during remainder of this MRC will damage test equipment.

NOFORN

NOFORN

PROCEDURE (Contd)

NOTE 1: If transceiver is connected to a jackfield, it may be utilized in lieu of test cable.

NOTE 2: If distortion analyzer has internal 600-ohm input termination, omit step 3.a.(1).

a. Measure receiver RF sensitivity.

- (1) Connect 620-ohm resistor across distortion analyzer input.
- (2) Connect test cable (connector PT08E20-41S to dual banana) between J22 on rear of transceiver and distortion analyzer input jacks (refer to figure 1).

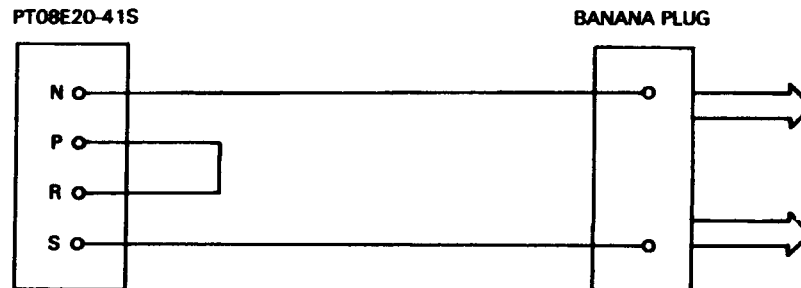


Figure 1

2BZV4-01

- (3) Set distortion analyzer FUNCTION switch to SET LEVEL.
 - (4) Set radio set SQUELCH switch to OFF.
 - (5) Set distortion analyzer METER RANGE switch for on-scale reading.
 - (6) Set radio set MEGAHERTZ switches to 116.000.
 - (7) Set signal generator controls for:
 - (a) Frequency of 116.0 MHz
 - (b) Modulation of 30% at 1000 Hz
 - (c) Output level of 1.5 microvolts (-103 dBm)
 - (8) Connect signal generator output to XCVR jack.
 - (9) Adjust distortion analyzer SENSITIVITY CONTROL for indication of 0 dB.
 - (10) Set distortion analyzer FUNCTION switch to DISTORTION. Adjust FREQUENCY and NULL BALANCE control for minimum indication on meter. Meter should drop at least 10 dB from reference.
 - (11) Repeat steps 3.a.(6) through 3.a.(10) at 134.000 and 151.900 MHz.
- b. Measure AGC response.
- (1) Set signal generator and radio MEGAHERTZ switches to 134.000 MHz. Set signal generator for 30% modulated signal at 1 kHz, 1 millivolt output level.
 - (2) Set distortion analyzer FUNCTION switch to VOLTMETER and note distortion analyzer voltmeter indication.
 - (3) Increase signal generator output level to maximum (not to exceed 1 volt); verify that distortion analyzer meter excursions do not exceed 3 dB from indication obtained in step 3.b.(2).

4. Measure Receiver Bandwidth and Verify Squelch Release and Operation.

a. Measure receiver bandwidth.

NOFORN

NOFORN**PROCEDURE (Contd)**

Filter PN 293 -1292-	Channel Spacing	6 dB Bandwidth	60 dB Bandwidth
040	25 kHz	Greater than 15 kHz	Less than 42 kHz

Table 2

b. Verify squelch release and operation.

- (1) Set signal generator and radio set to 134.0 MHz. Set signal generator for 30% modulation at 1 KHz, and RF output level for minimum signal (-120 dBm).
- (2) Set distortion analyzer FUNCTION switch to VOLTMETER.
- (3) Set SQUELCH switch to ON and note distortion analyzer meter indication.
- (4) Slowly increase RF output of signal generator and observe RF output level of signal generator when distortion analyzer voltmeter indication increases sharply. Nominal indication will be 1.5 μ V (-104 dBm).
- (5) Decrease RF output of signal generator and observe distortion analyzer voltmeter indication for a sharp decrease in value.
- (6) The difference in RF output level obtained from steps 4.b.(4) and 4.b.(5) should not exceed 7 dB.
- (7) Disconnect test equipment.
- (8) Reconnect ANT-XCVR coaxial jumper.
- (9) Ensure front panel switches are set as follows:
 - (a) A10A1S4 (PTT/CARRIER TEST) to PTT
 - (b) A10A1S3 (LOCAL/REMOTE) to REMOTE
- (10) Return equipment to readiness condition.

DISPOSAL METHODS FOR HAZARDOUS MATERIAL/WASTE IDENTIFIED IN THE TOOLS, PARTS, MATERIAL, AND TEST EQUIPMENT BLOCK

Method 1: Containerize waste in original container or use standard container as listed in Appendix B3-D of OPNAVINST 5100.19 series, "Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat" and the Naval Ships' Technical Manual (NSTM), S9086-T8-STM-010/CH-593, Pollution Control. Store in accordance with OPNAVINST 5100.19 series. Mark, label, or tag container with the specific contents and any information on the contaminants. This information must also be provided on the DD Form 1348-1 at the time of off-loading. Empty container guidance is available in the CNO Polic

Guide for Shipboard Hazardous Material Container Disposal, OPNAV P-45-114-95. Contact the receiving shore activity (e.g., FISC and PWC) to determine the appropriate local off-loading requirements.

NOFORN